PB83-181123

EPA Evaluation of the Gas Saving and Emission Control Improvement Device under Section 511 of the Motor Vehicle Information and Cost Savings Act

(U.S.) Environmental Protection Agency
Ann Arbor, MI

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U.S. Department of Commerce
National Technical Information Service
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1.

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(Please read Instructions on the reverse before completing)

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16. ABSTRACT

This document announces the conclusions of the EPA evaluation of the Gas Saving and Emission Control Improvement device under the provisions of Section 511 of the Motor Vehicle Information and Cost Savings Act.

The evaluation of the "Gas Saving and Emission Control Improvement" device was conducted upon receiving an application for evaluation by the manufacturer. The device is a 3/4 inch thick carburetor adapter plate that is installed between the carburetor and intake manifold. The device has internal passages that are connected to the throttle bore openings in the plate. These passages in the device are connected by a hose to a tee fitting installed in the hose between the carburetor and PCV valve. The device is claimed to reduce emissions, improve fuel economy, clean the engine and make it virtually maintenance free, and improve engine power.

The information supplied by the applicant was insufficient to adequately substantiate either the emissions or fuel economy benefits claimed for the device. EPA testing of devices that function similar to the "Gas Saving and Emission Control Improvement" device showed no significant emissions or fuel economy benefits. Thus, we have concluded that there is no technical basis to expect that the device would significantly improve either emissions or fuel economy or to justify an EPA confirmatory test program on the "Gas Saving and Emission Control"device.'

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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EPA Evaluation of the Gas Saving and Emission Control Improvement Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act

by
Edward Anthony Barth

January 1983

Test and Evaluation Branch
Emission Control Technology Divison
Office of Mobile Sources
U.S. Environmental Protection Agency

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

EPA Evaluation of the Gas Saving and Emission Control Improvement Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act

The Motor Vehicle Information and Cost Savings Act requires that EPA evaluate fuel economy retrofit devices and publish a summary of each evaluation in the Federal Register.

EPA evaluations are originated upon the application of any manufacturer of a retrofit device, upon the request of the Federal Trade Commission, or upon the motion of the EPA Administrator. These studies are designed to determine whether the retrofit device increases fuel economy and to determine whether the representations made with respect to the device are accurate. The results of such studies are set forth in a series of reports, of which this is one.

The evaluation of the "Gas Saving and Emission Control Improvement Device" was conducted upon the application of the manufacturer. This device is a 3/4 inch thick carburetor adapter plate that is installed between the carburetor and intake manifold. The device has internal passages that are connected to the throttle bore openings in the plate. These passages in the device are connected by a hose to a tee fitting installed in the hose between the carburetor and PCV valve. The device is claimed to reduce emissions, improve fuel economy, clean the engine and make it virtually maintenance free, and improve engine power.

The following is a summary of the information on the device as supplied by the applicant and the resulting EPA analysis and conclusions.

1. Title:

   Application for Evaluation of Gas Saving and Emission Control Improvement Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act

2. Identification Information:

   a. Marketing Identification of the Product:

      "Gas Saving and Emission Control Improvement Device"

      The application identified it as the "Gas Saving Device", see Section 6a(1).

   b. Inventor and Patent Protection:

      (1) Inventor

      Jack C. Shaffer
      P.O. Box 243
      Lynnville, IA 50153

(2) Patent

"The only copy of patent application is one which was certified and mailed to myself." This is further discussed in Section 6a(2).

c. Applicant:

Jack C. Shaffer
P.O. Box 243
Lynnville, IA 50153

d. Manufacturer of the Product:

(1) Shaffer Enterprises, Inc.
P.O. Box 243
Lynnville, IA 50153

(2) Principals

Jack C. Shaffer

3. Description of Product (as supplied by Applicant):

a. Purpose:

"This gas saving device is devised to enhance power, produce high level gas savings, clean the engine and make it virtually maintenance free, as well as drastically reduce emission pollutants."

b. Applicability:

(1) "This product is designed to provide better results on all U.S. manufactured automobiles and pickups, motorhomes, school busses, etc. on 4-8 cylinders engine from the current model year all the way back to models incorporating PCV in the [intake] manifold. One Toyota Celica was tested with excellent results."

(2) "This product has been tested from 100 ft @ 90° plus to over seven thousand feet @ temperatures in the high 20's, from Phoenix, AZ to Tulsa, OK in March of 1980 (see exhibit A enclosed)." Exhibit A was a copy of the United States Testing Company, Inc. trip report for one vehicle.

c. Theory of Operation:

"A plate has been designed for placement under the carburetor with routing holes which disperse and atomize the liquid fuel for longer burn time, [thereby] enabling the gasoline fumes to burn at a much higher rate of thrust, thus leaving less solids to drop to the [intake] manifold and eject out of the muffler system. This cleans up the engine allowing a cleaner tail pipe without having to lean out the engine. No adjustments are required on an automobile that is already up to manufacturers specifications."

d. Construction and Operation:

"The plate is 3/4 inch thick with internal grooves to control air flow on the gas jets which enables the gas to atomize and form a cyclonic mode which keeps solids [liquids] in the carburetor [throttle bore] rotating long enough to break them down into fumes which create engine thrust and forward movement for a significantly longer time span to eliminate premature solids [liquids] dropping onto the manifold and becoming waste for the exhaust system. The air is taken on demand from the PCV and utilized at optimum "

e. Specific Claims for the Product:

"A copy of everything available is enclosed. All installations shall be made by factory trained dealers with diagnostic equipment to measure, power, emissions, gas consumption, etc. prior to installation and retested after installation."

f. Cost And Marketing Information (as supplied by Applicant):

"The unit will retail for one hundred fifty dollars ($150.00) installed. The product has been developed over the past four years and tested since March, 1980, by an independent testing company (see exhibit A)." Exhibit A was a copy of the United States Testing Company, Inc. trip report for one vehicle.

4. Product Installation, Operation, Safety and Maintenance (as supplied by Applicant):

a. Installation - Instructions, Equipment, and Skills Required:

"The carburetor must be raised and the existing bolts or studs removed. A gasket furnished by the Co. is then put in place followed by the Gas Saver Plate. The existing gasket and carburetor are then replaced and 3/4 inch longer bolts are used for reinstallation. We furnish a tee and the required hose to

go from the "plate" to the tee and from the tee to the PCV and existing carburetor opening. Two clamps are furnished if required for the plate outlet and the carburetor outlet. On some models the accelerator linkage must be adjusted and a longer lifting pin is then furnished. A 1/2" box end wrench or ratchet is required as well as a screwdriver and a pair of pliers. General mechanical skills are all that is required."

b. Operation:

"Nothing will be furnished since the product does not require service nor maintenance."

c. Effects on Vehicle Safety:

"Since this is a solid plate and nothing on the engine has been modified, no safety precautions are required."

d. Maintenance:

"No maintenance is required on the product, and normal vehicle maintenance will be required less than before product installation."

5. Effects on Emissions and Fuel Economy (submitted by Applicant):

a. Unregulated Emissions:

"See Exhibits B and C". The exhibits to the application were not labeled. In addition to the United States Testing Company, Inc. trip report, there were two State of Arizona 'Vehicle Inspection Reports' on a 1973 Cadillac and one on another vehicle. There were also copies of Sun Diagnostic Analyzer printouts for the 1973 Cadillac.

b. Regulated Emissions and Fuel Economy:

"See Exhibits B, C, and D." See comments under 5a preceding.

6. Analysis

a. Identification Information:

(1) Marketing Identification:

The application identified the device as an air injected gas saving device that was to be identified as "Gas Saving Device" until a trade name was selected. Shortly

thereafter, the applicant chose "Gas Saving and Emission Control Improvement Device" as the marketing identification for the device (Attachment B).

(2) Inventor and Patent Protection:

To improve our understanding of the device, EPA requested the applicant to provide a copy of the patent (Attachment A). The applicant did not provide a copy. His response indicated that the patent application contained only a brief description of the device and that no detailed patent description of the device was available (Attachment B).

b. Description:

(1) The applicability of the product, as stated in Section 3b, to all US manufactured vehicles, was clarified to mean all US manufactured vehicles with carburetors (Attachments A and B). This excludes diesels and fuel injected vehicles.

The applicant stated that there are several models sold. These are identified by vehicle year and carburetor. Typically, one model fits several vehicles/carburetion configurations (Attachment B). However, the specific model numbers and specific vehicle application were not given.

(2) The theory of operation given in Section 3c describes the types of effects the device might have on the fuel/air mixture. However, installing a device like the Gas Saving and Emission Control Improvement Device in the induction system of an engine does not necessarily guarantee beneficial changes. For example, the device may not perform as expected, because the desired dispersion and atomization improvements do not occur. Alternately, the induction system of the vehicle may already perform efficiently and therefore no change would be noted.

(3) The description of the device provided in the application, Section 3d, was a very short, simplified, general description. Because a detailed description of the construction and operation of the device was needed to evaluate it, EPA requested the applicant to provide additional information (Attachment A). In response to this request, the applicant provided a clear plastic model of the device that permitted the internal passages to be readily seen (Attachment B). This model measured 4 1/2 x 6 x 3/4 inches (width x length x thickness) and had two large holes that were positioned inline with the two throttle bores of a two barrel carburetor. Two passages that are located 90 degrees apart bleed air from the PCV line into

each of these two larger holes. The bleed air enters at right angles to the fuel/air mixture passing through the throttle bores and these holes in the device. These four passages are manifolded together inside the device for connection by a hose to a tee fitting that is installed in the PCV line.

However, there were no internal grooves or gas jets to control the flow as stated in Section 3d. The passages measured one-fourth of an inch in diameter from the throttle bore holes to the point where they were manifolded together.

(4) No specific claims were made for the device in Section 3e. The claims made for the device in Section 3a are generalized claims. We therefore requested the applicant to state "what specific numerical improvements or range of improvements do you claim for reduction in emissions, improvements in fuel economy, and increase in power? To what mileage or time interval does '... cleans the engine and makes it virtually maintenance free...' refer?" (Attachment A).

The applicant responded that the "Emissions improvements exceed twenty percent. Fuel economy improvements exceed minimum requirements delinated in your letter of August 19, 1982 and exceed twenty to fifty percent in most cases. It requires from five hundred to one thousand miles to attain optimum efficiency on cleanliness, as well as emissions and gas savings" (Attachment B).

(5) The cost of the device plus installation was given as $150.00. However, due to the potential problems likely to be encountered in installing the device and the expensive specialized equipment required, see Section 6c(2), this cost is judged to be unrealistically low.

c. Installation, Operation, Safety and Maintenance:

(1) Installation - Instructions, Equipment and Skills Required:

The installation instructions given in Section 4a were a simplified, short summary of the device installation. However, for evaluation purposes, a more detailed description was needed and therefore requested (Attachments A and C). The instructions provided (Attachment B) were judged to be adequate for the installation of the device in the vehicle but inadequate in describing the necessary vehicle adjustments and skill levels required.

These instructions make only a brief mention of the necessity to readjust linkages to compensate for the device raising the carburetor 3/4 of an inch. EPA's experience with a similar device* which raised the carburetor one inch suggests that there are a number of problems with hood clearance and linkages to the throttle, choke, and automatic transmission. In addition, air hoses, electrical leads, fuel lines, and vacuum lines also required repositioning or relocating. Installation, including fabrication of parts and necessary adjustments, was judged to require more than two hours for the Turbo-Carb device. The same problems are anticipated for this device.

The applicant requires the use of specialized test equipment to checkout the vehicle before and after device installation. These include a Sun diagnostic analyzer, with emissions capability, a chassis dynamometer, and a fuel measuring device. This equipment is expensive and will add appreciably to the time and cost of installing the device.

The applicant does not state how this equipment is to be used or adjustments to the vehicle made. This presumably would be covered in the factory training given to the dealers.

The applicant statement that only general mechanical skills are required for proper installation and checkout of the device is very misleading. The installer will have to also be thoroughly familiar with the vehicle and have access to shop manuals. Also, he will need to be properly trained in the use of the sophisticated shop analyzer, chassis dynamometer, and fuel measurement unit.

(2) Operation:

If the various carburetor linkages altered by the installation are properly readjusted, the device is judged to not have any adverse effect on vehicle operation nor require special attention when operating a vehicle with the device installed.

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*"EPA Evaluation of the Turbo-Carb Device Under Section 511 of the Motor Vehicle Information and Cost Savings Act." EPA-AA-TEB-511-82-12.

(3) Effects on Vehicle Safety:

If the linkages are properly readjusted and the seal of the device to the intake manifold and carburetor is leakproof, the device is judged to have no adverse affects on safety as claimed in Section 4c.

(4) Maintenance:

The device will require the minimal maintenance given similar components in a vehicle (hoses, vacuum tees, leak checks of the carburetor base). However, there is no data, information, or technical basis that substantiates the claim of the applicant that "...normal vehicle maintenance will be required less than before product installation." as claimed in Section 4d.

d. Effects on Emissions and Fuel Economy:

(1) Unregulated Emissions:

The applicant referred to Exhibit B and C of the application for unregulated emissions. As noted in Section 5a, these data were not clearly identified. Also, these data were for hydrocarbon and carbon monoxide which are regulated emissions. However, since the device does not appreciably modify the emission control system of a vehicle, the device should not significantly alter the unregulated emissions of a vehicle.

(2) Regulated Emissions and Fuel Economy:

The applicant did not submit test data in accordance with the Federal Test Procedure and the Highway Fuel Economy Test. These two test procedures are the primary ones recognized by EPA for evaluation of fuel economy and emissions for light duty vehicles.*

The data the applicant supplied in exhibits A through D consisted of a 3000 mile road trip of a 1974 Lincoln Continental, State of Arizona vehicle inspection reports on a 1973 Cadillac and one other vehicle, and a diagnostic printout for the Cadillac. However, these data do not show

*The requirement for test data following these procedures is stated in the policy documents that EPA sends to each potential applicant. EPA requires duplicate test sequences, both before and after installation of the device on a minimum of two vehicles. A test sequence consists of a cold start FTP plus a HFET or, as a simplified alternative, a hot start LA-4 plus a HFET. Other test results which have been collected in accordance with other standardized procedures are acceptable as supplemental data as long as the results are statistically significant.

that the testing was conducted in a controlled manner. For example, the road test of the Lincoln showed two hundred miles difference in the trips, they were not over the same route, and the device tested appears to be substantially different than the model being evaluated. Also, the state inspections of the Cadillac were a year and 5,000 miles apart and did not specify with or without the device. There was only one state inspection for the other vehicle. The diagnostic printout also did not identify with or without the device.

The applicant was advised of the deficiencies in the data submitted (Attachment C) and the need to conduct FTP and HFET tests of the device at an independent laboratory (Attachments A, C, D, and E). This limited amount of testing would have readily confirmed the benefits for the device if it had been able to meet the specific claims given in Section 6b(4). The applicant did not provide this test data nor undertake this testing (Attachment E).

EPA has tested and evaluated a variety of air-bleed and carburetor base-plate adapters that are claimed to reduce emissions and improve fuel economy by promoting better mixing of the fuel and air. Although they are not identical to the Gas Saving and Emission Control Improvement Device, several of them function in a similar manner. These devices showed no emissions or fuel economy benefits*. Copies of several of these reports were given to the Applicant (Attachment C).

7. Conclusions

EPA fully considered all of the information submitted by the applicant. The evaluation of the Gas Saving and Emission Control Improvement Device was based on that information, EPA's engineering judgment, and our experience with other devices that function in a similar manner.

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*A few air-bleed devices have shown a small improvement in emissions or fuel economy by leaning out the richer fuel/air mixtures which were used by the manufacturers prior to emission controls. Without using a device, the same effect could also be achieved on these vehicles by leaning out the idle mixture screws. However, with the leaner fuel/air ratios now used by the manufacturers to control emissions and improve fuel economy, even these few devices would not show improvements. On the recent vehicles with computerized emission control systems, any changes a device caused in the fuel/air mixture, would automatically be negated by the computerized control system.

The information supplied by the applicant was insufficient to adequately substantiate either the emissions or fuel economy benefits claimed for the device. EPA testing of devices that function similar to the Gas Saving and Emission Control Improvement Device showed no signficant emissions or fuel economy benefits. Thus, we have concluded that there is no technical basis to expect that the device would significantly improve either emissions or fuel economy or to justify an EPA confirmatory test program on the Gas Saving and Emission Control Improvement Device.

Installation of the device is likely to be considerably more costly and difficult than claimed. Since the device raises the carburetor and its linkage, considerable time and skills are likely to be required to design and fabricate special parts and perform critical readjustments. Also the required shop test equipment is both expensive and not available in most shops.

FOR FURTHER INFORMATION CONTACT: Merrill W. Korth, Emission Control Technology Division, Office of Mobile Sources, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, MI 48105, (313) 668-4299.

List of Attachments

Attachment A Letter of September 7, 1982 from EPA to Jack C. Shaffer of Shaffer Enterprises, Inc. acknowledging receipt of the 511 application for the device and requesting additional information.

Attachment B Letter of September 14, 1982 from Jack C. Shaffer to EPA responding to request for information (Attachment A). This is a typed copy of the handwritten letter received.

Attachment C Letter of September 28, 1982 from EPA to Jack C. Shaffer clarifying and discussing information previously received and explaining need for independent lab testing of the device.

Attachemnt D Letter of November 15, 1982 from EPA to Jack C. Shaffer discussing test plan for the device.

Attachment E Letter of December 9, 1982 from EPA to Jack C. Shaffer confirming telepone discussions of the device and concluding evaluation process.

September 8, 1982

Mr. Jack C. Shaffer, President
Shaffer Enterprises, Incorporated
P.O. Box 243
Lynnville, Iowa 50133

Dear Mr. Shaffer:

We received your undated letter on August 31, 1982 in which you applied for an EPA evaluation of the "Gas Savings Device" as a fuel economy retrofit device.

Our Engineering Evaluation Group has made a preliminary review of your application and has identified several areas that require additional information or clarification prior to further processing. Our comments below address each section individually.

1. Section 2a. - Marketing identification. The marketing identification of the device is presently "Gas Savings Device". We will use this designation until you notify us of the final name.

2. Section 2b. - Inventor and patent protection. Please provide a copy of the patent application and identify the inventor.

3. Section 3c. - The theory of operation states ..."A plate has been designed with routing holes which disperse and atomize the liquid fuel for longer burn time enabling the gasoline fumes to burn at a much higher rate of thrust, thus leaving less solids to drop to the manifold and eject out of the muffler system." To which manifold does this refer, intake or exhaust?

4. Section 3c. - Construction and operation. This is a very simplified, short description of the device and appears to provide an adequate general description of the device. However, for evaluation purposes, a much more detailed description of the construction and operation is required. Please supplement the patent description, as necessary, to provide a more detailed description of the actual construction of the device.

5. Section 3e. - No specific claims were made for the device in the application or attachments. The claims given in Section 3a (purpose of the device) are generalized claims. What specific numerical improvements or range of improvements do you claim for reduction in emissions, improvement in fuel economy, and increase in power? To what mileage or time interval does "...cleans the engine and makes it virtually maintenance free..." refer?

6. Section 3e. - Cost and marketing information. Who are these "factory trained dealers" who will be selling and installing the device?

7. Section 4a. - Device applicability. The information provided indicates the device applies to all gasoline powered vehicles. Does this include vehicles with fuel injection or turbochargers? Is there more than one model sold to fit the various different carburetors? If yes, how are they identified?

8. Section 4b. - Installation, equipment and skills is a very simplified, short summary of the device installation. However, for evaluation purposes, a much more detailed description of the installation instructions is required. Please provide a copy of the installation instructions you provide to your factory trained dealers.

9. Section 4b. - What is the dealer-owned "...diagnostic equipment to measure power, emissions, gas consumption, etc...?"

10. Section 5. - Effects on unregulated emissions, regulated emissions, and fuel economy. The attachments to your application were not labeled B, C, and D as you indicated in your application. Only one of the attachments identified the test condition (with or without device). As I indicated in my previous letter to you, this type of data is of limited usefulness and then only for preliminary evaluation purposes. The supporting test data for an evaluation must be based on tests of the device (baseline and with device) at an independent laboratory using the Federal Test Procedure or Highway Fuel Economy Test.

This above information is needed to further process your evaluation. In order for us to conduct our evaluations efficiently, we have established a schedule for each. I ask that you respond to this letter by October 1. If you have any questions or require further information, please contact me.

EPA has evaluated and tested many fuel economy retrofit devices, some of which may be similar to the "Gas Savings Device." When you have supplied the information requested by paragraphs 1 through 10 above, I will send you a copy of those reports which appear most similar. Even if you do not consider your device to be similar to other devices we have evaluated, you may find them useful as an example of an EPA test and evaluation program.

Processing your application will require you to submit test data obtained at a recognized independent laboratory in accordance with the procedures indicated in the information I previously provided you. For your convenience, I have enclosed the current packet describing this procedure. I am prepared to assist you in developing a test plan which will allow you to conduct the appropriate testing at an independent laboratory.

Sincerely,

Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch

Enclosures

September 14, 1982

Mr. Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch
Environmental Protection Agency
Ann Arbor, Michigan 48105

Dear Mr. Korth:

Since our telephone conversation of this date, I shall attempt to answer questions one through ten.

1. "Gas Saving and Emission Control Improvement Device".

2. Jack C. Shaffer. I only have a registered letter sent to myself for patent protection.

3. Exhaust

4. I am enclosing one of the devices for your inspection.

5. Emission improvements exceed twenty percent. Fuel economy improvements exceed minimum requirements delineated in your letter of August 19, 1982 and exceed twenty-to-fifty percent in most cases. It requires from five hundred to one thousand miles to attain optimum efficiency on cleanliness, as well as with emissions and gas savings.

6. Cost is $150.00 installed. The only qualified installers are mechanics with training and diagnostic equipment (for example: new car dealerships).

7. Their is a model to fit all U.S. manufactured vehicles with all carburetor configurations which can produce greater economy being manufactured and identified as to type of carburetor, model years included as well as interchangeability.

8. To install this equipment, one must remove the carburetor and add the furnished kit as follows.

   a. Remove studs and replace with studs 3/4" longer.
   b. Put on the gasket supplied.
   c. Put on the plate supplied.
   d. Put on original gasket.
   e. Put the carburetor back on and tighten down.
   f. Make any other adjustments which may be required on throttle linkage, etc., to compensate for the additional 3/4" height created by the installation of the plate.

8. Cut hose from PCV on exhaust manifold and replace with the new hose in kit. A tee is furnished to receive 3/8" I.D. hose from PCV to tee. Another hose and clamp is furnished to go from the straight through portion of the tee opposite hose to PCV. The last hose goes from tee position to the tee back into the carburetor where hose from PCV previously entered. Replace filter assembly and the job is complete after all other hoses are reconnected to their original positions.

9. Sun diagnostic equipment or equivalent. With full range of test equipment which is now the state-of-the-art.

10. I have contacted both ATL, Inc., East Liberty, Ohio and Bendix Test Operations, Troy, MI for proposals on this testing along with their recommendations.

I hope this gives you a clear picture and will resolve those problems posed.

Sincerely,

Original signed by Jack C. Shaffer

Jack C. Shaffer
Box 243
Lynnville, Iowa 50153

P.S. The enclosed plate is made from clear plastic in order for your people to be able to see the principle. Their are obviously a great many different configurations.

NOTE: The original letter was handwritten. It has been typed to ensure legibility and reproducability.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ANN ARBOR, MICHIGAN 48105

September 28, 1982

OFFICE OF
AIR, NOISE AND RADIATION

Mr. Jack C. Shaffer, President
Shaffer Enterprises, Incorporated
P.O. Box 243
Lynnville, IA 50133

Dear Mr. Shaffer:

We received your letter of September 14 in which you provided additional information about your "Gas Saving and Emission Control Improvement Device". We wish to clarify the information you provided and address some of the questions you raised in your recent telephone call.

Our Engineering Evaluation Group has reviewed your application and the supplemental information you supplied. We have identified several areas which still appear to require further clarification or on which you may still wish to comment. Our comments below address each section individually.

1. Section 4b - The installation instructions you provided (copy enclosed) appear to be incomplete. The instructions do not tell how to hook up the device. It appears you wish to have the device connected by a hose going from the device to the straight portion of the tee that was inserted in the PCV line.

2. Section 4b - The installation and diagnostic test equipment consists of an engine analyzer which has the capability of measuring the compression, electrical, emission, fuel pressure, ignition, and vacuum characteristics of an engine. We now understand that this does not include equipment to measure fuel consumption or engine power, i.e. fuel flow meters or dynamometers.

3. Section 5 - Effects on unregulated emissions, regulated emissions, and fuel economy. EPA does not require a specific minimum level of improvement in emissions or fuel economy. The numbers cited in our letter of August 19, 1982 relate the number of tests required to demonstrate a statistically significant improvement to the expected level of improvement in fuel economy.

The data used to evaluate the performance of a device must be obtained under controlled test conditions using appropriate test procedures. This is why we require the substantiating testing of the device to be performed on a minimum of two vehicles (two test sequences without the device and two test sequences with the device on each vehicle). The procedures specified are the Federal Test Procedure (FTP) and/or the Highway Fuel Economy Test (HFET). However, the data you submitted do not show that the testing was conducted in a controlled manner. For example, the road test of the Lincoln showed two hundred miles difference in the trips, they were not over the same route, and the device tested appears to be substantially different than the model you provided. Also, the state inspections of the Cadillac were a year and 5,000 miles apart and did not specify with or without the device. While this information may have been of value to you in the development and evaluation of your device, these data will not withstand the scrutiny of an objective, impartial review.

Thus, satisfactory processing of your application will require you to submit FTP and HFET test data obtained at an independent laboratory. In order for us to expeditiously process the evaluation of your device, we have established a schedule for receipt of these data. Please submit your data by November 30, 1982. This should allow you sufficient time to develop a test plan, select a lab and have the device tested.

EPA has tested and evaluated a variety of air-bleed and carburetor baseplate adapters that are claimed to reduce emissions .or improve fuel economy. As I promised previously, I am providing you copies of several of the reports which appear to be most useful to you.

Again, I am prepared to assist you in the development of your test plan. Please let us know what laboratory you have selected and the scheduled dates for your testing when you send us your proposed plan. Please submit this information by October 12. If you have any questions or require further information, please contact me.

Sincerely,

Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch

Enclosures

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ANN ARBOR, MICHIGAN 48105

November 15, 1982

OFFICE OF
AIR, NOISE AND RADIATION

Mr. Jack C. Shaffer
Schaffer Enterprises, Inc.
P.O. Box 243
Lynnville, IA 50153

Dear Mr. Shaffer:

We received your letter of October 25 in which you requested our review and comments on your proposed testing of the "Gas Saving and Emission Control Improvement Device".

Based on the information supplied in your application, your responses to our letters, and our several phone calls, we feel we have developed sufficient understanding of your device to comment on the test plan. Our comments are based on that information and the following assumptions that appeared to be implied.

1. Installation of the device does not alter the vehicle characteristics, (e.g., idle speed, shift points, idle mixture, etc.).

2. No engine readjustments are required and all settings are to manufacturer's specifications.

3. Although the device takes 500 to 1000 miles to achieve its full benefit, the majority of the improvement can be observed immediately after installation of the device.

It is not clear if you claim the device will or will not affect cold start emissions or fuel economy. The Bendix quote was for cold start tests but the ATL quote was for hot start tests. Either type of testing would be acceptable to us.

Based on the preceding information and assumptions implied in your communications, it appears that Test Plan A (no parameter adjustment required and no mileage accumulation required) is appropriate for your device. Use test sequence Code 1 or Code 4 depending on whether you will be making claims for emissions or fuel economy improvements in cold operating conditions.

I have enclosed a copy of the basic test plan for 511 evaluations. Please let us know by November 29 the test sequence you select, the laboratory you select, and the scheduled dates for your testing. If you have any questions or require further information, please contact me at (313) 668-4299.

Sincerely,

Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ANN ARBOR, MICHIGAN 48105

December 9, 1982

OFFICE OF
AIR, NOISE AND RADIATION

Mr. Jack C. Shaffer
Shaffer Enterprises, Inc.
P.O. Box 243
Lynville, IA 50153

Dear Mr. Shaffer:

The purpose of this letter is to confirm our understanding of our telephone call of December 2.

Although you are still endeavoring to test your "Gas Saving and Emission Control Improvement Device" at an independent laboratory, you are presently unable to undertake the program discussed in my letters of September 28 and November 15. Therefore, we must complete our evaluation of your device using the information that is available. Processing the evaluation will take several weeks. I will send you a draft copy after it has completed our internal review.

If, in the future, you are able to have the device tested at an independent laboratory, we would welcome a new application from you. Please contact me prior to testing so that I can advise you of our current requirements. You may also contact me if I can be of any assistance before that time.

Sincerely,

Merrill W Korth

Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch